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and injuries of the roots, VI. diseases and injuries of the flowers and flower buds, VII. diseases and injuries of the berries. Under each of these groups are as many lettered or numbered divisions and subdivisions as may be necessary to include all of the diseases, one paragraph being given to each, with a numeral cross-reference to Part II, where a scientific description of the parasite may be found. When possible, classification is carried still farther, *e. g.*, under VII. diseases and injuries of the berries, the following subdivisions are given:

A. Rot of the berries.
  a–e.—Five paragraphs devoted to as many diseases.
B. Spots which hinder development, and sometimes completely destroy the berry, caused by fungi, which also occur on the leaves.
  a–g.—Seven paragraphs.
C. Spots of varied color which do not noticeably affect the growth and ripening of the berries.
  a–d.—Four paragraphs.
D. Injuries by insects.
  a–d.—Four paragraphs.
E. Dwarfing, protrusion of seeds, etc.

In Part II, under the appropriate classes, groups, orders, and families, there is a concise description of 1,332 injurious species, 423 of which are parasitic plants, mostly fungi, the descriptions of which are drawn principally from Saccardo, Winter, and Schröter. These 1,332 species are numbered serially, corresponding to the cross-references in Part I. A concise account is also given of the classes, orders, families, and genera to which these species belong, so that this part of the book is really a very serviceable compendium of parasitic plants and animals.

On the whole, this is the best book extant for the rapid determination of unknown plant diseases, and will therefore be of much use to students. The book would have had a wider circle of readers and have been still more useful if the author had included shade trees and all cultivated plants. Notes on treatment are given wherever anything definite has been ascertained, but this is the weakest part. The book is provided with a table of contents, an index to names, and a special index to technical terms.—ERWIN F. SMITH.

RUST IN WHEAT.—Report of the proceedings of the conference, convened by invitation of the Minister for Agriculture (the Hon. Sidney Smith), and held in Sydney [New South Wales] on June 2, 3, 4, 5, and 8, 1891. Sydney, Charles Potter, government printer, 1891. Folio, pp. 56, pl. 1.

The subject of rust in wheat has of late years excited the liveliest interest in the Australian colonies. According to a statement of the Minister for Agriculture, the total loss from the disease amounts to about £2,000,000 annually, and naturally a desire is felt to find some way of combating it. During the year 1890 many experiments were carried on. Details of these are given in the report of the conference convened at Sydney in June, 1891, at which delegates from the four colonies, Victoria, South Australia, Queensland, and New South Wales, were present.

The subject was discussed in all its phases, but it is neither possible nor desirable to enter fully into all the details. In Victoria the effects of manuring, spraying, drainage, varieties of seed, etc., were all tried. The results were largely negative, except in one instance, in Gippsland, where spraying with a solution of sulphate of iron, 1 ounce to 1 gallon of water, seemed to not only prevent but to stop further growth of the rust. More experiments are considered necessary in this direction, however. A series of questions was also sent out to farmers in Victoria and the results of the answers may be summarized as follows: (1) Rust seldom appears, to an injurious extent, in two successive years; (2) it generally appears early in October or November, depending upon the variety planted; (3) early-sown and early-maturing varieties escape the rust best; (4) in Australia the rust does not seem to require a change of host, but passes its entire existence upon a single one; (5) rust seems to prevail usually in seasons of excessive rainfall, especially in October and November, appearing when close and muggy weather sets in; its spread is most rapid in calm, hot days and dewy, foggy nights; windy weather as a rule is unfavorable; (6) the kind of soil seems to have no effect on the disease; (7) rust-shriveled wheat when sown appears to produce as good a crop and one as free from rust as plump seed; (8) no variety is free from rust in a bad season, but some are more and others are less affected, some few being free from rust for several years in succession.

The following suggestions are made as to the best measures to lessen or prevent damage: (1) Maintain a high standard of health; (2) use all possible measures unfavorable to and avoid those favorable to rust; (3) remove exciting causes where possible, by burning stubble, destroying weeds, etc.; (4) obtain as far as practicable rust-proof varieties; (5) spray crop with some solution at critical stage.

Experiments in Queensland reported on by Mr. P. McLean were mainly negative, owing to the exceptionally favorable year. Rust-shriveled seed wheat, however, was found by fifty-five out of sixty farmers to give good results.

Answers to inquiries made by the Department of Agriculture of New South Wales did not differ materially from those already given. At the conclusion of the report, however, the writer, Dr. N. A. Cobb, referred to investigations he had made on the fungi causing rusts (*Puccinia rubigo-vera* and *P. graminis*), stating that nearly all the damage was caused by the former. He described the changes these fungi undergo in development, and said they are found all the year on either wheat or native grasses. He also called attention to the fact that the larvæ of a species of insect had been found feeding upon the rust spores, and that while in this way a certain number of spores were destroyed they were also widely distributed by adhering to hairs covering the bodies of the insects. For prevention of the rust early sowing was advocated, and the belief was expressed that saccharate of copper would be useful in spraying for the disease.

This paper led to considerable discussion, especially in regard to the benefits of spraying. The general idea, however, was that if practicable this would be the best way of combating the disease. There was also considerable discussion over the matter of producing a rust-resisting variety of wheat, advocated by Wm. Farrer of New South Wales. Other reports were read and the conference finally submitted a report containing numerous recommendations. Among these were early sowing, cutting in the dough state except when to be used for seed, experimenting to obtain rust-proof varieties, the establishment of stations to distribute standard and desirable varieties, more extended use of red varieties in place of the white ones, rotation of crops, thin sowing, burning of diseased straw, experiments with spraying machines and fungicides, etc.

Incidentally, the disease known as "take-all" was discussed, the investigations of a commission of South Australia, in 1867 and 1868, being cited to prove that it is due to the presence of a minute animalcule which was called *Vibrio tritici* or eel of wheat. These animalculæ are harbored in a black deposit, a "lichen or moss," found between the roots and the first internode of the wheat plant. The disease works in patches, radiating in all directions from a center and destroys all cereals or native grasses in its course.

The conference, as a whole, may be regarded as a success. Views of diverse character were expressed by the delegates, and it is of course possible that what would apply in one colony would not in a distant one. Should the conference be instrumental in directing attention to methods for decreasing the amount of rust, and there is every reason for supposing that it will, its meeting will not have been in vain.—JOSEPH F. JAMES.